

## **Innovative Management for Teacher Professional Development in the Digital Age: A Meta-Synthesis**

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**Abstract:** This study addresses the limited conceptual integration of innovative management within the discourse on teacher professional development in the technology era. To bridge this research gap, the study synthesizes fifteen peer-reviewed international and national articles published between 2021 and 2025, aiming to identify dominant trends, strategic mechanisms, and challenges influencing innovation-oriented management in education. Using a qualitative meta-synthesis guided by the IMRAD analytical framework, four thematic domains were identified: (1) digital innovation and transformative school management, (2) structured quality management and continuous professional development, (3) digital literacy integration and technological adaptability, and (4) collaborative and reflective learning ecosystems. The findings indicate that innovative management characterized by digital leadership, quality assurance systems, and adaptive professional learning structures significantly enhances teacher competence and institutional performance. Nonetheless, persistent challenges remain, including uneven technological infrastructure, inconsistent policy implementation, and limited evaluation mechanisms for professional learning outcomes. This study offers an integrated conceptual insight into how innovation-oriented management strengthens teacher professionalism and supports digital transformation. The contribution of this synthesis lies in providing a comprehensive analytical foundation to inform policy development, leadership practices, and future research on technology-driven professional development.

**Keywords:** Digital Transformation, Educational Leadership, Innovative Management, Professional Development, Teacher Professionalism

### **A. Introduction**

The accelerating pace of technological change has redefined the landscape of education, demanding teachers to continuously adapt to new tools, pedagogical models, and management systems. Traditional models of teacher professional development (TPD), once reliant on periodic training, are being replaced dynamic,

technology-enabled, and innovation-driven systems (Meekaew & Khamdit, 2025; Isa et al., 2024).

The role of innovative management is thus central—transforming not only how schools operate but also how teachers learn and evolve professionally. Leadership programs in the digital era (Meekaew & Khamdit, 2025) and quality improvement systems (Isa et al., 2024; Sesmiarni, 2024) highlight that innovation in management structures empowers teachers to integrate technology, strengthen reflective practices, and enhance their professional identity.

This paper aims to consolidate findings from fifteen scholarly works to formulate an integrated perspective on how innovative management practices drive teacher professional growth within the context of technological advancement. What is missing in the current literature? Although numerous studies have examined innovative management, digital leadership, and teacher professional development in the technology era, the current body of literature still reveals several critical gaps. First, there is a lack of research that integrates these three elements comprehensively into a unified analytical framework capable of explaining the systematic relationship between innovative management, digital leadership practices, and teacher professional development mechanisms. Second, existing studies tend to address these aspects separately focusing on either management innovation, teacher digital competence, or professional development programs resulting in the absence of a holistic perspective on how innovative management directly shapes teacher growth within digital transformation contexts. Moreover, there is still limited systematic synthesis that compares international and national studies, preventing a more generalizable and globally informed understanding of theory and practice.

To address these gaps, this study is guided by two central research questions:

1. How do innovative educational management practices contribute to teacher professional development in the technology era?
2. What conceptual themes emerge from the synthesis of literature related to innovative management, teacher digital literacy, and continuous professional development systems?

These questions are designed to focus the study on the mechanisms, strategies, and impacts of innovative management on teacher professionalism and educational quality.

## **B. Methods**

This use approach *qualitative meta-synthesis* for integrate findings from various research that discusses innovation management, digital leadership, and development professional teachers in the technological era. Part This detailing strategy search

literature, criteria inclusion and exclusion, selection process articles, as well as procedure analysis thematic.

### *Strategy Search Literature*

Search systematic done on month January-March 2025 using several educational databases and modern management, namely: Scopus; Web of Science (WoS); ERIC (Education Resources Information Center); Google Scholar; SINTA (Science and Technology Index, Indonesia); DOAJ (Directory of Open Access Journals).

Keywords used built based on *Boolean operators*:

“innovative management” AND “teacher professional development”  
“digital leadership” AND “teacher competence”  
“technology integration” AND “professional learning”  
“continuous professional development” OR “CPD”  
“digital transformation” AND “school management”

Besides that, *snowballing technique* done on list library articles key for find source relevant additions.

### *Criteria Inclusion and Exclusion*

#### Criteria Inclusion

Article entered If fulfil condition following:

1. Rise year 2021–2025 (literature latest).
2. Focus on innovation management, digital leadership, digital literacy of teachers, or development professional teachers.
3. Use methodology clear scientific (qualitative, quantitative, or mixed-method).
4. Published in journal *peer-reviewed* international or national accredited.
5. Available in text complete (*full text*) in Language English or Indonesia.

#### Criteria Exclusion

Article issued if:

1. Only in the form of opinion, editorial, or non-peer-reviewed.
2. No in a way direct discuss management innovative or teacher professionalism.
3. Only discuss technology learning without link it with management or teacher development.
4. Research data not complete or cannot be verified.

## **C. Results and Discussion**

The synthesis revealed four key domains where innovative management significantly impacts teacher professional growth:

## **Digital Innovation and Leadership in School Management**

Studies (Meekaew & Khamdit, 2025; Masinambowa et al., 2025) underscore how digital-based leadership strengthens teachers' readiness to adopt innovation. Digital transformation initiatives in school administration streamline communication, data management, and instructional planning, fostering a culture of continuous improvement.

## **Structured Quality Management and Continuous Professional Development (CPD)**

Isa et al. (2024) and Sesmiarni (2024) emphasize that quality management frameworks provide measurable structures for enhancing teacher competence through monitoring, evaluation, and reflection cycles. Mulyono & Ibrahim (2024) further note that systematic CPD management ensures that teacher learning remains aligned with institutional goals and technological shifts.

## **Digital Literacy and Pedagogical Integration**

Yadav (2024), Krismanto (2023), and Hariyani et al. (2025) demonstrate that teacher digital competence extends beyond technical skills—encompassing pedagogical innovation, creative content design, and digital ethics. The studies advocate for integrated training that combines TPACK (Technological, Pedagogical, and Content Knowledge) with real-world classroom application.

## **Collaborative and Reflective Professional Learning Ecosystems**

Corujo-Vélez et al. (2021) and Salmerón Aroca et al. (2023) highlight the role of collaborative digital platforms (e.g., blogs, online communities, AI-driven PD systems) in enhancing reflection, feedback, and peer learning. These ecosystems promote teacher autonomy while maintaining a collective vision for quality enhancement.

Cross-cutting insights:

1. Innovative management directly correlates with improved instructional quality and teacher motivation (Pratiwi, 2025).
2. Leadership support mediates the effectiveness of technology integration (Landa et al., 2023).
3. Contextual challenges persist: limited digital infrastructure, uneven professional access, and inconsistent follow-up mechanisms.

Leaders who adopt innovation-driven frameworks (Meekaew & Khamdit, 2025; Isa et al., 2024) are more capable of inspiring teachers to integrate technology meaningfully into pedagogy. Similarly, CPD programs structured under quality management

principles yield measurable outcomes and sustained professional growth (Mulyono & Ibrahim, 2024). Moreover, digital ecosystems combining formal PD with informal online learning (Krismanto, 2023; Nor Maya & Hidayati, 2024) enable teachers to personalize learning trajectories while engaging in collaborative reflection. The integration of AI and learning analytics (Salmerón Aroca et al., 2023) further personalizes feedback, bridging gaps between theory and practice. However, several challenges hinder implementation: 1) Systemic disparities in digital access between schools; 2) Limited managerial training in innovation leadership; 3) Inadequate policy continuity for evaluating PD outcomes. To overcome these, educational institutions must cultivate adaptive leadership, provide continuous digital mentoring, and institutionalize data-driven evaluation systems.

**Table 1. Paper of Systematic Literatur Review (SLR)**

No	Title and Author	Research Object	Methodology	Major Discoveries	Conclusion
1	An Innovative Leadership Program for Teachers in the Digital Age. Journal of Practical Studies in Education, (Meekaew & Khamdit, 2025)	Regarding innovative leadership among primary school teachers in the digital era under the Ubon Ratchathani Primary Education Service Area Office 1, Thailand.	This study uses a mixed methods approach.	This research yielded the following findings: Stage 1: Study of the Current and Expected State of Innovative Leadership in the Digital Age Stage 2: Program Development.	The study found that the current level of innovative leadership among teachers is moderate, while the desired level is high across all dimensions measured. The areas that need the most improvement, ranked from highest to lowest, are: (1) technology integration, (2) innovative vision, (3) fostering an innovative organizational climate, (4) innovative creativity, and (5) teamwork.
2	Quality Improvement Management in Teacher Professional Development. (Isa et al., 2024)	The object of this research aims to evaluate the professional competence of elementary school teachers in Binjai City and the effectiveness of teacher quality management programs and related initiatives in improving teacher competence.	This research uses a qualitative research method with a descriptive approach, which attempts to describe and illustrate data obtained from the field related to the discussion.	Based on the results of initial observations conducted at two public elementary schools in Binjai City, it shows that the management of quality improvement and professional development of teachers at public elementary schools in Binjai City, namely Public Elementary School 024767 and Binjai Public Elementary School 020259, is already underway. However, the administrative capabilities themselves still need to be improved. This condition is evident from the non-functioning	The professionalism of teachers at SD Negeri 024767 and 020259 Binjai is relatively good, as evidenced by their bachelor's degree certificates, as well as their teaching qualifications in applied learning, innovative learning models, certified teachers, educational leaders, and national achievements. This has a positive impact on both schools, as each teacher can personally master their class, learn effectively, and utilize methods and strategies

				of one of the competency components, especially regarding staff placement and teacher competency improvement (Pratiwi & Warlizasusi, 2023; Sabariah, Hakim, Kadori, Zahra, & Muin, 2023).	effectively to create high-quality learning products.
3	Digital Innovation in School Management: Improving Educational Performance in the Technology Era (Masinambow et al., 2025)	The object of this research is administrative management, learning, and communication between educators, students, and parents.	The research method used is qualitative research with descriptive analysis and data collection in the form of literature studies.	Research shows that the use of digital innovation can improve administrative efficiency, accelerate decision-making processes, and enhance the quality of learning through interactive online learning platforms. However, challenges remain, such as gaps in technology access and the need for ongoing training for educators.	Digital innovation has great potential to improve educational performance, but requires policy support, adequate infrastructure, and training to maximize its benefits.
4	Teacher Professionalism in Technology Integration: A Pillar of Strengthening Educational Quality in the National Education Man(Hariyani Prasetyaningtyas et al., 2025)	This study aims to analyze the forms of teacher professionalism in integrating information and communication technology (ICT) into teaching practices as a strategy to improve the quality of national education.	This study uses a qualitative descriptive approach through a literature review of relevant academic sources, particularly those discussing the Technology Pedagogical Content Knowledge (TPACK) framework.	The research findings show that teacher professionalism is reflected in various activities such as designing TPACK-based learning, utilizing interactive digital media, participating in ICT training, developing digital teaching portfolios, and collaborating in digital design teams.	Sustainable strategies such as TPACK-based training, strengthening digital teacher communities of practice, equalizing infrastructure, and providing incentives and certification for digitally innovative teachers are recommended to strengthen ICT integration in the national education system.
5	The Role of Quality Management in Improving Teacher Competence in the	The object of this research is to improve teacher competence in the	This study uses a descriptive qualitative method to examine the	The results of this study indicate that the implementation of quality management practices has	The implementation of quality management at MTsN 1 Bukittinggi has a positive

	Era of the Industrial Revolution 5.0 at MTSN 1 Bukittinggi (Sesmiarni, 2024)	Industrial Revolution 5.0 era.	role of quality management in improving teacher competency at MTsN 1 Bukittinggi in the Industrial Revolution 5.0 era.	succeeded in significantly increasing teacher competence in professional, pedagogical, personality and social aspects.	impact in forming teacher competencies that are adaptive, innovative, and competitive, in accordance with the demands of today's digital education.
6	Continuing Professional Development. Management for Teachers and Principals. (Mulyono, 2020)	The object of this research is the management of continuous professional development for teachers and principals.	Using library research methods and content analysis techniques.	This research was conducted due to the following findings: (1) developments in science and technology, (2) global competition for education graduates, (3) regional autonomy, and (4) implementation of relevant curricula.	The results of this study can be concluded as follows: First, continuous professional development management is a competency development program for teachers and principals that is implemented according to needs, in stages, and on an ongoing basis to improve teacher professionalism. Second, teachers and principals are obliged to implement the Continuing professional development program in stages at each level of their rank, with the goal of enabling each teacher and principal to maintain, improve, and expand their knowledge and skills to carry out the learning process professionally. The chapter concludes by underscoring the importance of a supportive educational
7	Enhancing Digital Competencies of Teachers (Yadav, 2024)	It highlights the necessity for educators to develop digital skills to effectively	The study emphasizes that digital literacy encompasses not only	Additionally, it examines how digital storytelling and other innovative practices can engage	

		incorporate technology into their pedagogical practices and enhance educational outcomes.	technical proficiency but also the ability to critically evaluate and use digital tools ethically and creatively	students and improve learning experiences	environment and ongoing training to ensure that both educators and students thrive in the digital age.
8	Emerging E-Trends and Models in Teacher Education and Professional Development, (Mary Iamon & Carol.K.K.can, 2006) (Mary Iamon & Carol.K.K.can, 2006)	This research aims to explore the impact of implementing a digital-based management system in improving school operational efficiency and the quality of education.	The research method used is qualitative research with descriptive analysis and data collection in the form of literature studies.	The research results show that the use of digital innovation can increase administrative efficiency, speed up the decision-making process, and improve the quality of learning through interactive online learning platforms.	Digital innovation has great potential to improve educational performance, but requires policy support, adequate infrastructure and training to maximize its benefits.
9	Developing teacher professionalism independently through the utilization of information technology media (Nur Maya & Hayati, 2014)	This study aims to describe the development of teacher professionalism at SMP Muhammadiyah 3 Balikpapan.	Data collection methods included interviews and documentation.	Things found in extrinsic motivation are increasing knowledge, developing teaching skills, increasing knowledge, and increasing skills.	The analysis results consist of five categories with various underlying indicators. These five categories are intrinsic motivation, extrinsic motivation, platforms used, programs attended, and training outcomes.
10	Teaching innovation in the development of professional practices: Use of the collaborative blog (Carmen corujo, 2021)	This article presents an innovative proposal to develop the follow-up of the professional practices of the degree in Primary Education, and two Masters' in Psychopedagogy and Special Educational	Research Methods and Educational Diagnosis of the University of Seville (Spain).	The aspects to be studied are the development of communication, reflection, and collaborative learning processes during the internship period.	all the students thought that it was a very positive assessment of the experience for generating information exchange networks among colleagues and teachers. Finally, the relevance of constant monitoring of the academic tutor was highlighted.

11	Teachers' Professional Development and Intelligent Ways of Coping with It: A Systematic Review in Elementary and Middle School Education. (Juan Antonio Salmerón Aroca, 2024)	Needs using a learning management system (LMS) (Blackboard). This research addresses teacher training at different generational stages, with the aim of analyzing the training actions developed by school teachers and the intentionality of linking them to their professional development,	To this end, a systematic review of articles published between 2012 and 2022 in the main databases (WoS, Scopus, Eric, Dialnet, and Google Scholar) was carried out. After applying the inclusion criteria, 56 articles were selected and analyzed following the PRISMA 2020 statement.	The findings show the interest and importance of initial, continuous, and lifelong learning among teachers as a driver of professional development.	The results also show that research is mostly focused on novice teachers and qualitative methodologies predominate, although this is limited to certain countries and specialized publications.
12	Leader support and the integration of innovative teaching-learning technologies: The mediating role of technology (Antonio, 2023)	the object of this research is investigating leadership support for the integration of technological changes in education has not led to the explicit specification of what support teachers would entail from their mid-level academic leaders	The study used Structural Equation Modeling (SEM) to analyze the extent to which leader support influences the integration of ITLTs, mediated by the TKL when controlled for demographic factors such as age, gender, and ITLTs prior knowledge	The resulting results reveal that the integration of ITLTs among academics is positively influenced by leader support; the higher the support the academics receive from their leaders, the better the integration of ITLTs.	This study, therefore, proves the inclusive findings and extends the research on the potential of mid-level academic leadership to bring about educational change in higher learning and thus, enhance the integration of ITLTs.
13	Teacher Professional Learning In The Perspective Of Educational Technology (Antonio, 2023)	This research explores the professional learning of technology-based teachers from the	To achieve the objectives of this research, a qualitative approach through the method of literature study or library	Teachers' increasingly massive and diverse use of gadgets allows their facility to be directed at teacher learning activities to improve their competence and professionalism.	The research results concluded that teacher professional development shifted into professional learning. The process is conditioned and built

	(Wawan Krismanto, 2023)	perspective of learning technology.	research is a research method that is considered relevant.		actively, self-regulated, sustainable, and based on social and contextual processes according to the teacher's problems and needs.
14	Innovative Learning Strategies and the Role of Teacher Professionalism in Improving the Quality of Education (Pratiwi, 2025)	This study aims to analyze the impact of innovative learning strategies and teacher professionalism on improving education quality in secondary schools.	Using a quantitative approach with a correlational descriptive design, data were collected through questionnaires from 50 junior and senior high school teachers in Padang.	The findings indicate a positive and significant correlation between innovative strategies and teacher professionalism with improved education quality ( $p < 0.05$ ).	Conclusion: Strong synergy between innovative learning strategies and teacher professionalism is essential to promote adaptive and sustainable education quality.
15	Traditional and innovative models of managing teachers' professional development in management theory (Bodnar, 2024)	This study examines traditional and innovative models of teacher professional development within the context of management theory.	The traditional model of teacher professional development has important characteristics, such as a hierarchical approach; a uniform training program for all (One-Size-Fits-All); and the implementation of periodic professional training days.	This article shows that the findings in the field of improving the management of teacher professional development are related to the integration of various scientific and practical approaches to maintain psychological and didactic comfort in communication between participants in the educational process; the search for professional development programs that are universal and individual in online and blended modes; and the consideration of organizational factors in teacher training on the job.	According to the author, a combination of traditional and innovative models in teacher professional development, driven by wise leadership and a responsive organizational culture, can produce more effective and meaningful teacher professional development.

## **D. Conclusions**

The findings of this meta-synthesis demonstrate that innovative management serves as a fundamental driver of teacher professional development in the technology era by fostering adaptive, collaborative, and improvement-oriented educational environments. Innovative management integrates digital leadership, structured quality assurance, technology-driven learning systems, and reflective professional cultures, enabling teachers to enhance their digital competence, pedagogical capacity, and professional autonomy while designing learning practices that respond effectively to students' needs. The synthesis reveals that successful professional development is not solely determined by formal training, but is strongly influenced by managerial strategies that provide technological infrastructure, continuous mentoring, and collaborative ecosystems where teachers can exchange best practices and engage in data-informed self-reflection. Practically, educational institutions must strengthen school leadership capacities, ensure equitable technological access, design flexible and responsive professional development programs, and establish digital ecosystems that support continuous teacher learning. These implications call for a paradigm shift from passive participation in traditional training toward self-directed, reflective, and innovative professional learning embedded within school culture. Future research should explore the development of context-sensitive innovative management models, conduct longitudinal evaluations on the impact of technology integration on teacher performance, and examine the potential of artificial intelligence and learning analytics to enhance professional development effectiveness. Overall, this synthesis provides a comprehensive conceptual foundation for improving educational management practices and advancing sustainable digital transformation in strengthening teacher professionalism.

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